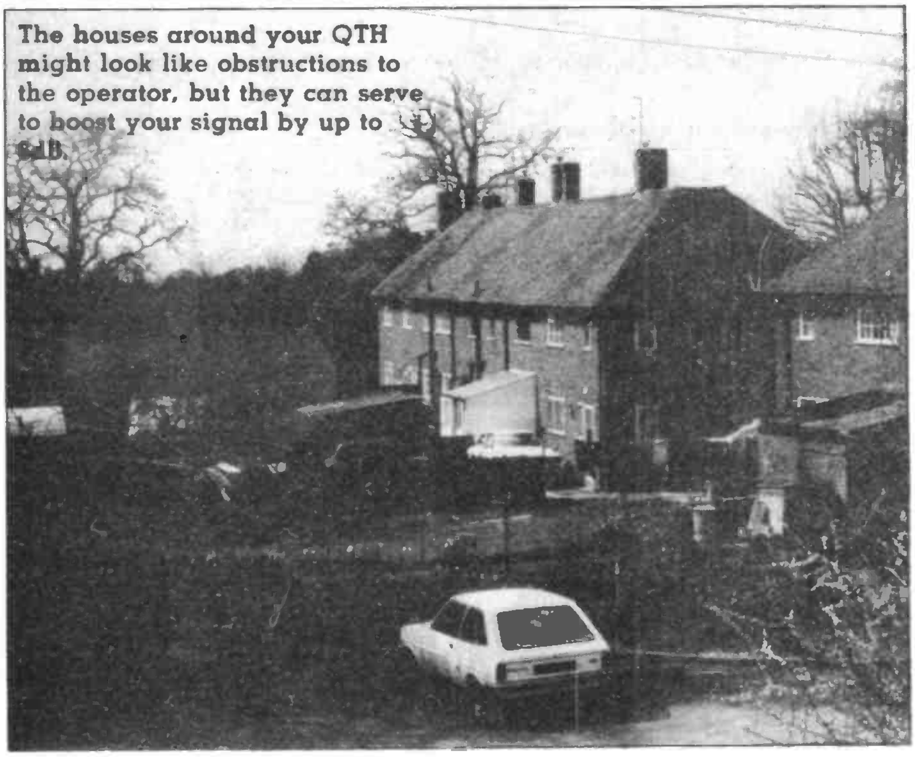
My QTH isn't very high...

A good take-off?
Ever dreamt of moving your house to the top of a mountain somewhere? You might be better off on the low ground than you think you are.
By Frank Ogden G4JST, Editor.



The houses around your QTH might look like obstructions to the operator, but they can serve to boost your signal by up to [illegible]dB.

There seems to be only one general view of the optimum VHF QTH: at the top of a hill with nothing obstructing the view for miles. If at all possible, it should be arranged that the ground around slopes gently down on all sides to the plain way below. For preference, there should be no trees, pylons, buildings or anything else to break-up the smooth contour of the land.

A QTH fitting the above description would be a desirable place to set up a VHF/UHF station in one respect only, line of sight communications. Height, pure and simple, does not affect tropospheric DX as much as one might imagine.

Not a perfect mirror

To understand the point, one needs to appreciate a few of the subtleties of VHF/UHF tropo propagation. The sky is very much less than a perfect mirror. The refractive index interface which produces DX conditions is a) not a continuous sheet and b) a refractor rather than a reflector. Tropo bending occurs under inversion conditions: dense but humid cold air sits on top of warmer, dryer air close to the surface of the ground. This produces something like a dielectric waveguide which has, on one side, the warm air close to the ground, and on the other, the rarefied thin stratosphere on the other. The conducting strand of cold but humid air sits trapped between the two.

This duct can carry signals for 100s and occasionally 1000s of miles along the whole length of a weather front. Once signals have entered into the duct, they will not emerge and radiate back to earth until a local atmospheric disturbance such as a strong thermal lets the signal out. The graded index optical fibre provides an excellent analogy to tropospheric propagation. The refractive index of the fibre alters across its cross section such that light entering the fibre tends to be reflected towards the middle where it stays for the passage down the fibre.

If one makes a nick or a break in optical fibre, the light floods out at the discontinuity and scatters in all directions. Tropo ducts behave in precisely the same way. Even though DX paths may exist within a plate of tropo ducting (remember that a tropo duct is more like an elongated plate than a wire) you won't necessarily gain access to it unless your aerial is sufficiently close to a discontinuity to fire into it.

Height no advantage

The effects of these 'holes' can be heard during any lift. There are large numbers of discontinuities in the sheet, each of which has a constantly changing characteristic. This translates into the peaks and fades in received signal strength. Signals from the other side of the country may come in at 30dB over S9 while closer stations (or stations further out) may produce signals at the limits of audibility. This situation can reverse itself in the course of a couple of minutes.

The actual height of the station aerial has singularly little to do with the operator's ability to gain access